Please amend claim 48 as follows:

48. (Amended) A method for detecting contours on a specimen surface, comprising:

applying light energy to said specimen surface, said light application comprising generating light using a light generating device and receiving light from said light generating device and imparting light toward said specimen surface; and

detecting surface variations having relative surface height variations of less than approximately 1000 nanometers and surface contours over areas larger than particles and scratches, said detecting comprising transmitting light energy received from said specimen surface, receiving a retro beam deflected therefrom and transmitting said retro beam toward a predetermined target.

Please cancel claim 49.

Please cancel currently pending claim 60.

Please add the following claims:

--61. The method of claim 48, further comprising the steps of weighting and summing information received from said detecting step.

62. The system of claim 1, wherein said specimen moves relative to said optical element arrangement.

63. The method of claim 37, further comprising moving said specimen relative to said arrangement of optical elements.--

REMARKS

Claims 1-17, 24-31, and 37-50 remained after the Election made on January 7, 2000. Applicants note the Examiner's indication of confusion with respect to the claim grouping of the Restriction and thank the Examiner for the clarification. Based on the previous claims remaining from Applicants' cancellation of claims resulting from the Election, Applicants have cancelled claim 60 and added former claim 51 as claim 61. Applicants have added new claims 62-63. Thus claims 1-17, 24-31, 37-50, and 61-63 are pending in the current application.

Section 112 Rejections

The Examiner rejected claims 4, 8,-10, 42, 43, 45, and 46 under 35 U.S.C. § 112, first paragraph, relating to the term "dark field collection arrangement" of claim 4 and "Nomarski DIC" of the remaining claims. With respect to the dark field collection arrangement language, Applicants point to, *inter alia*, the summary of the invention wherein Applicants state:

> Optionally, the beam may be caused to pass through polarization optics and a birefringent prism, which produces two beams of orthogonal polarization that diverge from each other by a small angle. This angular divergence results in a physical separation of the two beams at the focus of the optical system on the specimen surface, in the same manner as that used in Nomarski differential interference contrast (DIC) microscopy. DIC microscopy is illustrated in U.S. Patent 5,798,829 to Mehdi Vaez-Iravani, entitled "Single Laser Bright Field and Dark Field System for Detecting Anomalies of a Sample", issued August 25, 1998 and assigned to KLA-Tencor Corporation.
>
> After the split beam contacts the specimen surface, the light scattered at a narrow angle to the incident beam from surface defects is collected in the Dark Field Narrow (DFN) channel, while most of the light scattered at larger angles by the surface defects is collected in the Dark Field Wide (DFW) channel. The remainder of the beam is specularly reflected back through the components outlined above. As two beams illuminate the wafer surface, two beams are returned through the elements up to the birefringent prism, which combines the two retro beams into a single beam. The single beam is returned through the remaining elements.

(Emphasis added).

This passage describes the darkfield aspect of the current system. Claim 1 is not limited to a brightfield or darkfield arrangement and reads on either arrangement. Claim 4 specifically states that the optical element arrangement comprises a dark field collection arrangement, supported in the specification by the dark field wide and dark field narrow channel arrangement described above. Further, Applicant notes that according to MPEP Section 706.03(n), the original claim is part of the disclosure and can set forth subject matter not found elsewhere in the application. While applicants contend that the darkfield aspect of the invention is readily apparent to one of ordinary skill in the art based on the language included therein, Applicants have nonetheless included wording in the specification to completely support the "dark field collection arrangement" language of claim 4.

With respect to the Nomarski DIC language used in the remaining claims, the Examiner at pages 3-4 of the Office Action discusses his understanding of the functioning of beamsplitter 105 and Nomarski prism 106. As may be appreciated from a review of FIGs. 1 and 2, the beamsplitter 105 and beamsplitter 118 are elements included in the arrangement to divert the retro beam toward diode/detector array 117. As explained in the specification, beamsplitters 105 and 118 are polarizing beamsplitters which polarize the entering light. At page 8 of the specification, polarizing beamsplitter 105 is said to be optional. In Fig. 1, polarizing beamsplitter 118 diverts the retro beam toward the diode/detector array 117, while the optional polarizing beamsplitter 105 does not split the retro beam, but merely returns the beam without splitting. Similarly, in Fig. 2, beamsplitter 118 does not split the retro beam, but polarizing beamsplitter 105 directs the beam toward diode/detector array 117. Thus depending on the desired location of the diode/detector array in the system, Figs. 1 or 2 in addition to the text of the specification indicate the function of the non-diverting beamsplitter as merely returning the retro beam. For the Nomarski DIC prism, the claims rejected by the Examiner generally include phrases such as "optical element arrangement comprises a Nomarski Differential Interference Contrast sensor" (claim 8) and the Nomarski DIC sensor "divides light received in a single beam into a plurality of beams" (claim 9). These statements are supported in the specification by birefringent or DIC prism 106, explained in detail at page 10, ll. 10-29 of the specification. Should the Examiner still consider the rejection based on the Nomarski DIC prism meritorious in view of this information, Applicant respectfully requests further clarification of the alleged deficiencies in the relevant claim(s).

Section 112, 2nd paragraph: Claims 24-31 and 48-50

The Examiner rejected claims 24-31 and 48-50 under 35 U.S.C. 112, second paragraph, based on an alleged lack of structure. Applicant has added elements to independent claims 24 and 48 and submits that all claims now fully conform with Section 112, paragraph 2.

Section 102

The Examiner rejected claims 1, 6, 11, 13, 16, 17, 37, 41, 44, and 47 under 35 U.S.C. 102(b) based on Rosenfeld. Rosenfeld illustrates a system having laser energy optically directed toward a uniformly rotating prism 17, which thereupon sends light energy toward a

lens 13 and surface 21. Light reflected from the surface 21 is split by polarization beamsplitter 16 and directed toward two element position sensor 26. The position of the surface 21 relative to the lens 13 is fixed. Rosenfeld only discloses two elements for sensor 26, and the block diagram in FIG. 4 of the circuitry which yields the first derivative and surface profile outputs can only support two elements, and thus only a crude approximation of the surface could be available to someone using Rosenfeld.

In contrast, Applicants have invented and claimed a system and method which can detect surface variations having relative surface height variations of less than approximately 1000 nanometers and greater than approximately 1.0 nanometer. Applicants use a unique multiple linear element sensing array which can detect minor variations in the surface of the specimen. One could not use the disclosure of Rosenfeld, particularly the two element sensing arrangement disclosed therein, to produce the beneficial effects associated with Applicants' invention. Thus claims 1 and 37, as amended, are neither anticipated nor obvious in view of Rosenfeld.

Section 103

The Examiner rejected claims 2-5, 7, 12, 14-15, 24-31, 38-40, and 48-50 as unpatentable over Vaez-Iravani in view of Rosenfeld. The Examiner primarily relies on Vaez-Iravani for the "tilt-measuring system" disclosed therein, and the use of an optical isolator.

With respect to claims dependent on claims 1 and 37, i.e. claims 2-5, 7, 12, 14-15, and 38-40, applicant has amended claims 1 and 37 to include the multi-element linear sensing aspects of the current invention as discussed above. No such multi-element sensing component is disclosed in Vaez-Iravani, and thus these claims are not obvious in view of the cited references, as the references neither disclose nor suggest limitations present in the base claims.

With respect to claims 24-31 and 48-50 (as well as new claim 61), Applicant submits that the claims, as amended, are not obvious in view of the asserted combination. In particular, Applicants disagree that the disclosure of Rosenfeld supports the recited measurement tolerances. The cited passage of Rosenfeld (column 4, ll. 59-63) merely discusses use of a magnifying glass to increase sensitivity. Applicant submits that this magnifying glass could

not satisfy the tolerances provided in the system of amended claim 24 or the method of amended claim 48. Rather, the use of a magnifying glass merely increases the image size on sensor 26, which still requires the two element comparison technique illustrated in Fig. 4. In contrast, the system and method disclosed and claimed by Applicants provides significant sensitivity able to sense even small anomalies on the surface of the specimen, i.e. those in the 1.0 to 1000 nanometer range. Applicant further notes that the combination of Vaez-Iravani to Rosenfeld constitutes an impermissible attempt to recreate Applicants' claimed invention using hindsight, as there is no indication in either reference to combine the references in the manner suggested. Thus Applicants respectfully submit that the claims, as amended, are not rendered obvious by Rosenfeld and Vaez-Iravani.

CONCLUSION

In view of the foregoing, it is respectfully submitted that all claims of the present application are in condition for allowance. Re-examination and reconsideration of claims 1-17, 24-31, 37-50, and 61-63, as amended, are respectfully requested and allowance of all claims at an early date is solicited.

Applicant hereby authorizes the Patent Office to charge any deficiencies or credit any overpayment to Deposit Account 16-1805.

Respectfully submitted,

Date: JUNE 5, 2000

Steven W. Smyrski, Reg. No. 38,312
a member of
PILLSBURY MADISON & SUTRO LLP
725 S. Figueroa St., Suite 1200
Los Angeles, California 90017
(213) 488-7100